Action of Disinfectants.

R. KOCH (*Mittheil. der Kaiser. Gesundh.* 1881, Band x.; *Rep. der Analyt. Chemie.*, 1882, No. 1) has tested the ordinary disinfectants in three ways. 1. To ascertain whether a particular disinfectant is capable of destroying the resting-spores of bacilli (the latter form the greater part of pathological bacteria), which are the most difficult of all forms of life to destroy. Every disinfectant is to be removed from the list of the disinfectants which may be generally used in infectious diseases, when it cannot destroy the developing power of the resting-spores. The resting-spores of splenic fever were generally employed for experiment. 2. To ascertain how the disinfectant behaves with regard to more easily destructible fungi, yeast, bacteria, bacilli, and micrococci. 3. To ascertain whether the disinfectant is capable of arresting the development of micro-organisms in suitable alimentary beverages.

Carbolic acid did not prove itself to be a sovereign disinfectant. A 5 per cent. solution only sufficed after two days to arrest the developing power of splenic fever spores; while a 1 per cent. solution destroyed in two minutes the bacilli themselves of splenic fever. A solution of 1 in 850 sufficed to check the development of the latter. A soaking, five to seven times repeated, in a 5 per cent. solution of phenol, was sufficient to only retard the development of the resting-spores of splenic fever. The fact is very noticeable that carbolic acid in oil, or in alcoholic solution, is absolutely without effect on the bacilli and spores of splenic fever. The latter, after remaining 110 days and 70 days respectively, in a 5 per cent. solution of carbolic acid in oil and in alcohol, were repeatedly found intact. The same was the case with *salicylic acid* and *thymol*. In the form of vapour better results were obtained with carbolic acid, only at higher temperatures. But even the action of carbolic acid vapour at 75 deg. Cent. for two hours, failed to destroy the resting-spores completely. Chemical combinations of carbolic acid with other bodies, or cheap raw products containing carbolic acid, were less efficacious than the pure preparation. A 5 per cent. solution of zinc sulpho-carbolate, destroyed the resting-spores of splenic fever in five days; a 5 per cent. solution of sodium phenate (carbolate) in ten days merely reduced their power of development, while sodium sulpho-carbolate failed to do this within the same period of time. Crude wood-spirit, and pyroligneous acid in a concentrated state, destroyed the resting-spores in twenty and two days respectively; while wood and coal-tar, in a moderately concentrated condition, had no effect.

Sulphurous Acid.—Even under such favourable conditions as are not attainable in practice, sulphurous acid fails to destroy all minute living organisms. The experimenter says this is a very uncertain disinfectant, as is also calcium bisulphate.

Zinc Chloride.—In spite of the prevalent opinion that a solution of 1 in 1000 of this agent is a safe disinfectant, it was found that even a 5 per cent. solution failed within a month to weaken the developing power of the splenic fever spores.

After testing various other substances, Koch concludes that the only certain disinfectants are chlorine, bromine, and corrosive sublimate; and that to arrest development, only corrosive sublimate, certain ethereal oils, thymol, and allyl-alcohol are available. Bromine vapours are recommended for confined spaces. Chlorine is a little less satisfactory, but more so than was formerly supposed. In all places where neither gases nor heat are available, corrosive sublimate, and indeed all the mercurial salts are recommended. A solution of 1 per 1000 of the mercuric chloride, sulphate, or nitrate, killed the resting-spores in ten minutes;

and, indeed, simple moistening of the earth containing the spores with this solution is sufficient to arrest their power of development. Solutions of 1 in 1000, to 1 in 15,000, are sufficient to kill micro-organisms. The poisonous action of such diluted solutions may be disregarded. The cost also is far below that of carbolic acid.—*London Med. Record*, Aug. 15, 1882.

Action of Disinfectants on Anthrax Virus.

Actual experiment with morbific germs is the only way of acquiring definite knowledge on the value of disinfectants. Moreover, there is reason to believe that there are vast differences in the power of resistance possessed by germs of different kinds, so that it cannot be assumed that the results obtained with one are true of another. More facts are still needed, and we note therefore, with interest, a series of experiments which have been made at Lyons by Arloing, Cornevin, and Thomas on the influence of various disinfecting agents on the virus of symptomatic anthrax. The results have been published in the *Lyons Médicale.* If pulp from the tumours in this disease is allowed to dry slowly at a temperature of 35° C., a residue is obtained in which the organisms of anthrax retain their full activity. A few cubic centimetres of water, through which a little of the residue is diffused, has a virulence not inferior to that possessed by the fresh virus, and which continues for at least two years. The experiments on the influence of disinfectants were carried out with this dried virus, and also with perfectly fresh virus. It was found that the resisting power of the former is much greater than is that of the latter. Whatever destroys the dried is capable of destroying also the fresh virus, while the converse is not true. The different substances tested were left in contact with the virus for forty-eight hours, and the test of virulence was the hypodermic injection of five drops. The following substances were found to have no action even upon the fresh virus: alcohol saturated with camphor or with carbolic acid, glycerine, ammonia, acetate and sulphate of ammonia and sulphate of ammonium, benzine, a saturated solution of chloride of sodium, quicklime and lime-water, polysulphide of calcium, a one-in-five solution of chloride of manganese, a one-in-five solution of sulphate of iron, a one-in-five solution of borate of soda, a one-in-five solution of tannic acid, a one-in-ten solution of sulphate of quinine, a one-half solution of hyposulphite of soda, essence of turpentine, and monobromide of camphor; of gases, ammonia, sulphurous acid, and chloroform. A saturated solution of oxalic acid, a one-in-twenty solution of permanganate of potash, a one-in-five solution of soda, vapour of chlorine, and of sulphide of carbon destroyed the activity of the fresh virus, but had no effect on that which had been dried, while the activity of the latter was destroyed only by solutions of carbolic acid (2 per cent.), salicylic acid (1 in 1000), nitrate of silver (1 in 1000), sulphate of copper (1 in 5), boric acid (1 in 5), saturated salicylic alcohol, corrosive sublimate (1 in 5000), and bromine vapour.

Thus many substances unanimously regarded as antiseptics were without effect upon the virus, even in the fresh state. Pure or camphorated alcohol is largely used by surgeons in France to wash their instruments, but is evidently capable of giving only an illusory safety against morbid germs. Quicklime, in which it is often recommended that the bodies of animals dying of anthrax should be buried, and with which the walls of infected places are washed, is no better. At the moment of its hydration some organisms are probably destroyed by the heat which is disengaged, but those which are not in immediate contact with the lime seem to have preserved all their activity. Very thin layers of the tissue of the tumours of anthrax were taken and rolled up and plunged into the quicklime, and left in it for forty-eight hours. At the end of that time they were rubbed